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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,742	12/11/2001	Kiyohiko Yokota	216859USOXPC	1739

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EXAMINER

TESKIN, FRED M

ART UNIT

PAPER NUMBER

1713

DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

MEV

Office Action Summary

Application No.
09/926,742

Applicant(s)
Yokota, et al.

Examiner
Fred Teskin

Art Unit
1713



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3, 4 6) ☐ Other:

Art Unit 1713

1. Claims 1-10 are currently pending and under examination.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 103(c) and potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103(a).

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Arai et al 6235855 B1.

Arai et al disclose the production of species of aromatic vinyl compound-alpha olefin copolymer by a method which differs

Art Unit 1713

from applicants' only in that the copolymerization catalyst is formed of a transition metal compound with a metallocene skeleton having one crosslinking group formed exclusively of a carbon-carbon crosslinking skeleton, instead of two cross-linking groups as defined in claims 1 and 2 [e.g., dimethylmethylene crosslinking group as in Examples 1 and 2 in cols. 25-26 of Arai].

It would have been obvious to one of ordinary skill in the art to modify the copolymerization process of Arai et al by utilizing a metallocene compound with two crosslinking groups, at least one of which is formed exclusively of a carbon-carbon crosslinking skeleton, in lieu of a singly bridged metallocene where an aromatic vinyl compound-olefin copolymer having a very high aromatic vinyl compound content is desired. Indeed, Arai et al teach that when a transition metal compound having a bite angle of at most 120° is employed, such copolymer having a very high aromatic vinyl compound content is obtained, col. 9, ll. 1-8. Arai et al further teach that such a bite angle can be accomplished "when in the above formula (2-1) *or* (2-2), Y is a methylene group or a C_{1-15} hydrocarbon group. In the case of the formula (2-2), Y may be the same *or different*." (Id., ll. 9-12; emphasis added.) As described in column 8, formula (2-2) depicts a transition metal metallocene

Art Unit 1713

containing two Y bridging groups corresponding to applicants' crosslinking groups, and specific species of that compound formula are listed at column 9, lines 21 et seq.

Given the above teachings, one of ordinary skill in the art would have been well motivated to conduct the copolymerization method of Arai et al in the presence of a transition metal metallocene compound having a metallocene skeleton with two crosslinking groups as defined in claims 1 and 2 hereof.

5. Claims 1-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese 9-302014 ("Japanese").

Japanese demonstrates the production of an ethylene/aromatic vinyl compound copolymer by a method which differs from applicants' essentially in the use of catalyst formed of a catalyst component (I) which is a metallocene in which two cyclopentadienyl groups are joined, or crosslinked, by two dimethylsilylene ($-\text{SiMe}_2-$) groups, i.e., at least one crosslinking group is not formed exclusively of a carbon-carbon crosslinking skeleton as per claims 1 and 2. See Japanese at page (4), cols. 5-6.

However, since Japanese explicitly teaches [col. 3, ll. 5-14 and Abstract, second parag. and formula I] the alternativeness

Art Unit 1713

between (substituted) silylene groups and (substituted)alkylene groups as crosslinking groups Y and Y' of the metallocene catalyst component, one would have reasonably expected a metallocene wherein at least one crosslinking group is formed exclusively of a carbon-carbon skeleton, e.g., the $-CMe_2-$ analogue of dimethylsilylene, to perform equivalently in the disclosed copolymer production method. Accordingly, it would have been obvious to one of ordinary skill in the art to modify Japanese by conducting the copolymerization method in the presence of a transition metal metallocene compound wherein at least one of Y and Y' is formed exclusively of a carbon-carbon skeleton, as claimed.

6. Claims 1-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0 721 954 A1 ("European").

European demonstrates the preparation of an ethylene/1-octene copolymer in the presence of a zirconocene catalyst component possessing the requisite number and kind of bridging groups; see Example 27(5) and compound A-7 at page 39.

It would have been obvious to utilize an aromatic vinyl compound as comonomer in this example in place of 1-octene because European generically teaches alpha-olefins having 3 to 8 carbon

Art Unit 1713

atoms as copolymerizable with ethylene and, moreover, lists specific styrenic compounds as exemplary alpha-olefins. See in particular page 19, lines 17-21 where styrene, p-methylstyrene, isobutylstyrene and t-butylstyrene are all listed as suitable alpha-olefins along with aliphatic olefins such as 1-octene.

The limitations of the dependent claims are either disclosed by the applied art or obvious from the teachings thereof. Thus, as to claims 5 and 6, species of the claimed alkylating agent (C) are taught by European (page 17, lines 40+), as is the possibility of using other comonomers such as dienes and cyclic olefins (page 19, lines 27-33). As to the presence of an additional chain transfer agent (per claims 7 and 8), note page 19, lines 46-48 where molecular weight adjustment of the polymer through the use of hydrogen, a notoriously well known chain transfer agent, is proposed.

7. No claims are allowed.

8. Any inquiry concerning this communication should be directed to Examiner F. M. Teskin whose telephone number is (703) 308-2456. The examiner can normally be reached on Monday through Thursday

Application/Control No. 09/926,742


-7-

Art Unit 1713

from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (703) 308-2450. The appropriate fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 (non-after finals) and (703) 872-9311 (after-finals).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.


FRED TESKIN
PRIMARY EXAMINER
1713

FMTeskin/06-15-02